An Evaluation of the Prevalence of Hypokalemia and Hypomagnesemia in the VGH and BC Wide Peritoneal Dialysis Population and Frequency and Cost of Prescription of Potassium and Magnesium Supplements

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Background
- Potassium and magnesium are minerals essential in the functioning of the human body, and low levels of either may adversely affect normal neuromuscular, cardiovascular, and metabolic processes.1
- Peritoneal dialysis (PD) patients are at increased risk for hypokalemia and hypomagnesemia due to continuous loss of these minerals via dialysate dwell.2
- Studies have shown low potassium and magnesium levels in PD patients to be independent risk factors for mortality.3,4
- There is no current funding for potassium or magnesium supplements through the BC Provincial Renal Agency (BC PRA).

Objectives
- To determine the one-year prevalence rate of hypokalemia and hypomagnesemia in the Vancouver General Hospital (VGH) and BC wide PD patient population.
- To assess the one-year frequency and cost of prescription of potassium and magnesium supplements in the VGH and BC wide PD patient population.

Methods
- Design: Multi-center, retrospective review utilizing the Patient Records and Outcome Management Information System (PROMIS) database
- For BC wide data, report provided by PROMIS statisticians
- Study Period: May 1, 2017 to April 30, 2018 (one year)
- Inclusion: All BC patients on PD at any point within this timeframe
- VGH cohort only included PD patients who were still on this dialysis modality on May 1, 2018 when the PD patient list was generated.

Outcomes:
- Prevalence of hypokalemia, defined as K < 3.5 mEq/L
- Prevalence of hypomagnesemia, defined as Mg < 0.7 mmol/L
- Prescription frequency of potassium and magnesium supplements
- Yearly cost estimates of potassium and magnesium supplementation based on unit costs and dispensing fees provided by MacDonald’s Renal Pharmacy and Laurel Prescriptions

Results

Discussion
- For all BC PD patients (n=1217), 97.5% of patients had serum potassium levels checked at least every 3 months; however, the frequency of serum magnesium-level monitoring was much lower at 58.3% of patients.
- Prevalence of hypokalemia and hypomagnesemia were higher than the actual prescription of potassium and magnesium supplements, respectively.
- Cost may present as a barrier, even in patients with private health insurance.
- Compared to other nutritional supplements and hyperkalemia exchange resins listed on the BC PRA formulary, potassium and magnesium supplements have similar or lower costs, e.g. cost of a 106-day supply of KCl 8 mEq/day is $4.52 and Mg complex 106 mg/day is $10.99 versus Renavite 1 tab/day is $6.15, zinc gluconate 70 mg/day is $5.76, and Kayexalate 15 g/day is $294.87.

Limitations
- Prevalence of hypokalemia and hypomagnesemia may be underreported as some sites do not monitor potassium and magnesium levels at all or monitor less frequently than every 3 months (cut-off for study inclusion).
- Patients were excluded from supplement cost analysis if event dose could not be determined (n=25) or if they were on as needed dosing regimens (n=20).
- For BC wide data, we relied solely on the PROMIS database and were unable to verify information with individual patient charts as was done with VGH data.

Conclusion
- We would propose that potassium and magnesium supplements be added to the BC Provincial Renal Agency dialysis formulary.

References
2. Amirmokri P, Morgan P, Bastani B. Intra-peritoneal administration of potassium and magnesium: a practical method to compare to other nutritional supplements and hyperkalemia exchange resins listed on the BC PRA formulary, potassium and magnesium supplements have similar or lower costs, e.g. cost of a 106-day supply of KCl 8 mEq/day is $4.52 and Mg complex 106 mg/day is $10.99 versus Renavite 1 tab/day is $6.15, zinc gluconate 70 mg/day is $5.76, and Kayexalate 15 g/day is $294.87.

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